Determinants of Female Garment Workers' Housing Choices in Bangladesh

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Abstract

A large number of female garment workers in Bangladesh, who migrated from the countryside to urban areas, are facing severe housing issues. Most live in slums or squatter settlements. As the readymade garment industry significantly contributes to Bangladesh's economy, the government was concerned about this housing issue, and built a dormitory-type residence especially for female garment workers. Although the accommodation came with essential facilities and low rent, it failed to attract female garment workers. Therefore, this study aims to discover what element is considered crucial from workers' perspectives regarding housing choices, specifically in terms of dormitory-type housing. A choice-based conjoint (CBC) analysis was performed by conducting a questionnaire survey by visiting workers' houses. Part-worth utilities and marginal willingness-to-pay were evaluated to determine the importance of each attribute. From the CBC analysis, privacy, along with larger room area space, were found to be the most important attributes. Based on the findings, the study also makes recommendations to refurbish dormitory-type houses for future project planning.

Keywords: Female garment worker, Housing choice, Dormitory, Choice-based conjoint analysis, Bangladesh

1. Introduction

1.1 Background and Research Objectives

Bangladesh is the world's second most prevalent player in ready-made garment (RMG) exports. According to the Export Promotion Bureau, 83.4% of the state's total export earnings originate from this sector. Therefore, the garment sector is treated as the lifeblood of Bangladesh's economy ¹⁾. Between 2017 and 2018, 4.2 million people worked in 4,560 RMG industries ²⁾.

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For women migrating from rural to urban areas for better employment prospects, this industrial sector provides the largest opportunities ³⁾. Currently, almost 80% of the total workforce in the RMG sector is female ³⁾.

In city areas, workers are presently living in rented slums, squatter settlements ⁴⁾, or boarding houses referred to as a “mess” ^{5) 6)}, with few or no amenities. Congested houses, shared rooms, unhygienic baths, shared kitchens with unsafe gas connections, filthy surrounding environments due to lack of solid waste dumping systems, and inadequate electricity and water facilities are common issues in these residences (from interviews with female garment workers in Gazipur in September 2018). However, few factories have made arrangements regarding workers’ accommodation. Not only are the provided facilities insufficient, but the number of factory accommodations are also rapidly diminishing. With their meager wages, female workers cannot afford superior accommodation facilities that charge high rents. Therefore, safe and affordable housing is identified as one of the major issues faced by these migrant women workers ⁵⁾.

Photo 1: Female garment workers living in a “Mess”

(Source: Captured by the author during interview surveys in Gazipur in September 2018)

Photo 2: Shared toilet and kitchen with unsafe gas connection

(Source: Captured by the author during interview surveys in Gazipur in September 2018)

The Nari Uddug Kendra (NUK) is a pioneer and only NGO working on female garment workers’ housing issues in Bangladesh. The NUK operated seven garment workers' housing units from 1991 until 2016. All of these were in rental buildings because they could not build model housing for garment workers due to the lack of funding. On the other hand, running hostels in

rental buildings without any financial help was also difficult for them. They were looking for government land to construct sustainable and affordable housing. Finally, NUK purchased 12,000 m³ of land in Savar to develop housing for 3,000 workers. Unfortunately, the project was stopped due to funding constraints (interview with the Founder and Executive Director of NUK, Mashuda Khatun Shefali on August 4, 2020). After the collapse of the Rana Plaza factory complex, which killed more than 1,000 workers, the Bangladeshi government took some initiatives to improve working conditions in the garment industry⁷⁾. After this tragic occurrence, the Bangladesh government, as well as foreign buyers, became conscious of the conditions faced by garment workers, and organizations were established to improve their working environments and prevent such accidents. However, the government was not concerned about the workers' housing problems. The international attention and criticism of the garment workers' execrable and dangerous working conditions led to the government prioritizing their working rather than housing conditions. No measures were taken toward the workers' accommodation problem until the Bangladeshi government constructed a 12-storey dormitory building for female RMG workers in 2016 at Ashulia, near the Dhaka Export Processing Zone area, on the outskirts of Dhaka.

Regardless, the dormitory project at Ashulia is argued to be unsuccessful. Two years after construction, only 90 residents dwell in the 12-storey, well-decorated building despite its capacity of 836 beds, and amenities such as electricity, water supply, common toilet and baths, a day-care center facility for workers' children, and a medical center. In the dormitory, while there are no common kitchens, daily meals are provided for BDT 150 (USD 1.77) per day. Additionally, the government has set a meager monthly rent of BDT 500 (USD 5.91) for each cost in the dormitory.

Photo 3: Government dormitory for female garment workers
(Source: Captured by the author in Gazipur in October 2018)

As a preference, female workers currently reside in slum or squatter settlements where the average rent is BDT 1,000 (USD 11.82) (from questionnaire surveys with female garment workers in Gazipur in November 2018). A UN-Habitat report points out that the high-rise building

provided for slum dwellers is hostile to their traditional social patterns that make use of community and open space for lifestyle and income opportunities. In addition, the dormitory dwellings are difficult for occupants to repair or extend as changing family circumstances dictate, and require expensive commercial interventions⁸⁾. While this may justify the choice of female garment workers who require housing that accommodates family members, it does not explain the choice of single female garment workers. Considering this, it is essential to understand the tangible reasons that female garment workers are more comfortable living in slum areas rather than a well-facilitated government dormitory that provides safe and affordable accommodation.

Therefore, this paper aims to study the determinants of migrant female garment workers' housing choices in Bangladesh, focusing on dormitory-type housing. It is also important to understand the priorities among these factors, so that we may discover where improvements to the dormitory project should be made. Thus, this study also aims to investigate the priority hierarchy among the pointed determinants. Finally, based on the analysis, recommendations are offered for better planning of dormitory projects.

1.2 Literature Review on low-income group housing issues in urban areas and living conditions of RMG workers in Bangladesh

Affordable housing in the metropolitan cities of Bangladesh is currently a prevalent problem among low-income groups, resulting in several studies on this issue. However, most studies concentrate on low-income groups residing in Dhaka City, rather than in districts outside it. Mohammed (2002) focused on the role of Bangladeshi NGOs in urban housing for the poor within Dhaka city⁹⁾. He evaluated the potential of NGOs that would influence resolutions to current housing difficulties, and strategies to intensify their participation in urban housing programs. Begum (2007) also conducted a study on urban housing issues in Dhaka city¹⁰⁾, revealing contextual statistics of the city, planning initiatives along with policy attention, issues around insufficiency, high land prices, quality of housing as well as the role of public and private institutes in funding accommodation. Shams et al. (2014) studied housing established under the public sector along with policies that the Bangladeshi government is following for the middle and poor classes who are struggling to stay alive in Dhaka City's temporary accommodations¹¹⁾.

Laborers working in Bangladesh's RMG sector are considered to make up the majority of the low-income group. Numerous studies have been conducted on this group. Ali et al. (2008) evaluated improvement in livelihood patterns as well as physical and mental problems faced by female garment workers after joining RMG factories¹²⁾. Sikhdar et al. (2014) assessed factors influencing the socio-economic conditions of female garment workers by performing frequency distribution¹⁾. Akhter et al. (2010)¹³⁾ and Ahmed and Raihan (2014)¹⁴⁾ discussed the health and safety issues that female garment workers face while working in the garment industry. Although

female workers suffer the most in terms of affordable and adequate housing, no original research has been conducted focusing specifically on female garment workers' housing choices.

There are a number of studies about housing and residential choice using various methods, such as the decision plan nets method, the meaning structure method, conjoint analysis, the residential images method, lifestyle method, neo-classic economic analysis, and longitudinal analysis in the field of housing economics ¹⁵⁾. This study employs conjoint analysis to identify female garment workers' preferences for housing attributes in Bangladesh. Conjoint analysis has been applied to examine a wide range of issues related to residential preferences, such as to model the preferences of specific groups, preference for specific areas, and the impact of environmental amenities ¹⁶⁾. There are limited studies using conjoint analysis to elicit slum dwellers' preference for housing attributes. Kim et al. (2019) employed conjoint analysis to identify the causal effects of land tenure on slum dwellers' housing preferences in five urban slums in Nairobi, and found that slum dwellers prefer a more secure land tenure type rather than contested land ¹⁷⁾. Other studies have used different methods to explore housing/residential choice/preference in slum dwellers/low-income residents. Das et al. (2017) examined the question of why slum dwellers reside in inhuman conditions; is it because a clean environment is not a priority for residence selection, or is it simply non-affordability? They conducted a survey in slums in India, and employed a hedonic approach. They found that house prices vary according to various structural variables, and the government provides only two of the neighborhood features – streetlight and sewage facility¹⁸⁾. While there are some studies that reveal slum dwellers' housing preferences, the number is limited; more studies are required in various places and for various household attributes.

2. Research Framework

2.1 Study Area

While Dhaka is considered the traditional choice for the RMG industry, the present focus of the Bangladeshi government is to shift the RMG industry to other districts. Moreover, due to high land and property prices, new entrepreneurs are not interested in establishing industries in Dhaka.

Therefore, government policies are focusing more on areas such as Savar, Gazipur, and Narayanganj. Gazipur is the second-largest district enriched with RMG factories. Due to the implementation of different rapid transit projects (Bus Rapid Transit and Mass Rapid Transit) between Dhaka and Gazipur, low land prices, and increased land availability, Gazipur has become the first choice for new and old entrepreneurs to establish garment businesses.

Figure 1: Location of Gazipur with all sub-districts indicating four study areas.

(Source: BANGLAPEDIA, Website: <http://en.banglapedia.org>)¹⁴⁾

To consider the severity of the problem, the author selected Gazipur as the location of the study, specifically four different sub-areas—Konabari, Luxmipura, Horinarchala, and Vogra—enriched in RMG factories to assure arbitrariness and access more available data. Figure 1 shows the areas where the survey was conducted.

2.2 Conjoint analysis

Conjoint analysis is one of the most used research tools in marketing and consumer research¹⁹⁾. This method observes how people's preferences influence choosing a product or service. Conjoint analysis involves breaking down a product or service into different components, which are called attributes and levels, and then analyzing combinations of those components to discover what a person prefers most. Using this method, the utilities of each level of each attribute can be found in terms of its weight or consumer preferences. It also reveals the element or part of a product or service considered more critical by stakeholders, that is, some groups might consider price to be an essential element while choosing, whereas others might place more importance on features.

The choice-based conjoint (CBC) analysis offers greater confidence in the fact that preferences elicited from users and potential users of facilities reflect the kinds of choices people make in their daily lives²⁰⁾. This method is often called a choice experiment or choice modeling²¹⁾. Among several types of conjoint analyses, this technique is most suitable when there is a

limited number of attributes to be computed. Conjoint analysis aims to estimate utility functions that can be used to compare residential alternatives in terms of peoples' preferences ²²⁾. The present study used this method to evaluate the housing choices of female garment workers. Several studies used choice modeling to evaluate housing preferences among stakeholders. Conjoint analysis is especially useful in understanding the trade-offs people make between residential attributes, for example, in estimating willingness to pay for certain qualities in a residence ²³⁾.

A regression model has always been used previously to determine the utilities of each attribute's levels. The most common are the multinomial logit model and the conditional logit model. This study used the conditional logit model for calculation. CBC analysis lets researchers include a "None" option for respondents, which might read "I wouldn't choose any of these." By selecting this option, a respondent can contribute information about the expected decrease in demand ²⁴⁾.

2.3 Formation of Hypothetical CBC Scenario

The attributes and levels necessary for CBC analyses were selected by performing an extensive literature review ^{1) 4) 5) 6)} on present living conditions of female garment workers, and the already constructed government dormitory. Additionally, interview surveys were conducted in the study area to authenticate the selected attributes and levels. Two hundred interviews, over almost three weeks, were completed in September 2018. These interviews also assisted the author in writing sample answers or options for some questions asked in the final survey, to enable respondents to easily understand questions and answer them decorously.

The interview surveys conducted with female RMG workers revealed several problems faced by female garment workers in their present living situations, such as poor materials used for the construction of houses, poor drainage and water supply systems, poor solid waste management systems, a lack of security, issues regarding rent, numerous people sharing a room, lack of toilet and kitchen areas, and gas connection facilities. The dormitory project tried to fix almost all of these problems. The only issues unaddressed by the government dormitory project were shared rooms and toilets, and the lack of a common kitchen and gas connection. Consequently, the author selected attributes as the number of people sharing one room and size of the room (hereinafter called "shared room area"), number of people sharing a toilet/bathroom (hereinafter called "shared toilet/bathroom"), and dining facility along with price/rent as unsolved dormitory problems.

Figure 2: Study methodology framework (Source: Author)

The author also visited the government dormitory and conducted interviews with officials working there as well as with other government officials related to this dormitory project working under the ministry in October 2018, to learn more about the whole project, facilities, rules and regulations, management systems, and resident enrollment system. The findings of these interviews assisted in the preparation of the questionnaire sets.

The levels of each attribute were determined by evaluating the interview surveys of female RMG workers and officials. Currently, the government dormitory boarders need to share a 90 m² room with 20 persons while paying BDT 500 per bed, so these were considered as one level each of shared room area, and people and price, respectively. Optionally, the facility provides a 20 m² room shared with four people at a rent of BDT 1000 per bed, and were selected as the other two levels.

Similarly, levels for the shared toilet/bathroom were selected. The government dormitory is now providing a dining facility against per meal payment to residents, and this was considered as a level of the dining facility. The interview surveys revealed that the boarders wanted access to a common kitchen with a gas facility in the dormitory, so this was added as another level of the dining facility.

After finalizing the attributes and levels, profiles were prepared for the respondents to select from. This study chose four different attributes to analyze, of which the first three had three levels to choose from, while the last had two levels. The author assigned different numbers for each level of each attribute to make profiles from their combinations. The attributes, levels, and numbering are presented in Table 1.

Table-1: Attributes and levels in Conjoint Profile (Source: Author)

Attribute	Level	No.
Monthly Rent	Tk. 1000	1
	Tk. 800	2
	Tk. 500	3
Shared Room Area	20 m ² room shared with 4 people	4
	50 m ² room shared with 10 people	5
	90 m ² room shared with 20 people	6
Shared Toilet/ Bathroom	Shared with 8 people	7
	Shared with 6 people	8
	Shared with 4 people	9
Dining Facility	Per meal payment with dining facility	10
	Gas connection with kitchen facility	11

Based on these attributes, the study established a total of fifty-four ($3 \times 3 \times 3 \times 2 = 54$) profiles. We excluded dominant profiles, which is impractical, for example, low rent with high quality of services, and selected 36 profiles (Table 2). Twelve combinations of three profiles, which we call ‘question’, were developed (Table 2). To obtain more practical answers, the authors added a “None of the above” option for each choice set (Table 3). Each question had three answer options, which are the three profiles, with an extra “None” option (Table 3). The 12 questions were then divided into four groups, which we call ‘choice sets’. We divided the respondents into four groups and allotted one question choice set to each group (Table 3). Therefore, three choice sets are prepared for one respondent, and each respondent is required to select one preferred option in each choice set. Therefore, one respondent selects the preferred option three times.

Table 2: Conjoint Profiles (Source: Author)

Profile No.	Price/ Rent	Shared Room Area	Shared Toilet/ Bathroom	Dining Facility	Question No.	Name of the Choice Set
1	1	5	9	11	Q1	Set A
2	2	6	9	11		
3	3	6	7	10		
4	3	5	8	11	Q2	
5	2	5	9	10		
6	1	4	7	11		
7	1	5	8	11	Q3	
8	2	5	7	10		
9	3	6	8	10		
10	3	6	7	11	Q1	Set B
11	2	6	8	11		
12	1	5	7	11		
13	1	4	9	11	Q2	
14	2	4	8	11		
15	3	4	7	11		
16	3	5	9	10	Q3	
17	2	4	7	10		
18	1	4	9	10		
19	1	5	7	10	Q1	Set C
20	2	6	9	10		
21	3	6	8	11		
22	3	5	8	10	Q2	
23	2	4	7	11		
24	1	4	8	11		
25	1	5	9	10	Q3	
26	2	5	8	10		
27	3	5	7	11		
28	3	6	9	11	Q1Q1	Set D
29	2	5	8	11		
30	1	4	7	10		
31	1	4	8	10	Q2	
32	2	5	9	11		
33	3	5	7	10		
34	2	5	7	11	Q3	
35	1	5	8	10		
36	3	6	9	10		

Table 3: Example of a choice set

Choice Set A

Question 1: If you are considering to rent a dormitory for female garment workers for living, which option you will choose?

profiles Attributes	Option 1 (profile 1)	Option 2 (profile 2)	Option 3 (profile 3)	Option 4
Price/Rent	BDT 1000	BDT 800	BDT 500	None: I wouldn't choose any of these
Shared Room Area	50 m ² room shared with 10 people	90 m ² room shared with 20 people	50 m ² room shared with 20 people	
Shared Toilet/Bathroom	Shared with 4 people	Shared with 4 people	Shared with 8 people	
Dining Facility	Gas connection with kitchen facility	Gas connection with kitchen facility	Per meal payment with dining facility	

Question 2: If you are considering to rent a dormitory for female garment workers for living, which option you will choose?

profiles Attributes	Option 1 (profile 4)	Option 2 (profile 5)	Option 3 (profile 6)	Option 4
Price/Rent	BDT 500	BDT 800	BDT 1000	None: I wouldn't choose any of these
Shared Room Area	50 m ² room shared with 10 people	50 m ² room shared with 10 people	20 m ² room shared with 4 people	
Shared Toilet/Bathroom	Shared with 6 people	Shared with 4 people	Shared with 8 people	
Dining Facility	Gas connection with kitchen facility	Per meal payment with dining facility	Gas connection with kitchen facility	

Question 3: If you are considering to rent a dormitory for female garment workers for living, which option you will choose?

profiles Attributes	Option 1 (profile 7)	Option 2 (profile 8)	Option 3 (profile 9)	Option 4
Price/Rent	BDT 1000	BDT 800	BDT 500	None: I wouldn't choose any of these
Shared Room Area	50 m ² room shared with 10 people	50 m ² room shared with 120 people	90 m ² room shared with 20 people	
Shared Toilet/Bathroom	Shared with 6 people	Shared with 8 people	Shared with 6 people	
Dining Facility	Gas connection with kitchen facility	Per meal payment with dining facility	Per meal payment with dining facility	

2.4 Outline of Questionnaire Survey

A questionnaire survey was conducted in four study areas in November 2018. A total of 200 samples were gathered by visiting the residential areas of female garment workers, located in slums and squatter settlements. The author hired and trained four local school teachers to interview participants, who felt insecure talking to unknown persons, and were more comfortable answering CBC question sets when talking to locals. The outline of the questionnaire survey is summarized in Table 4.

Table 4: Outline of the questionnaire survey

Location	Konabari: 45 people Vogra: 51 people Horinarchala: 59 people Lokhipura: 45 people
Total No. of sample	200 people
Sampling process	Random sampling
Mode of survey	Question asking by author and hired interviewers (Four local schoolteachers)

Before asking the CBC sets, 11 open-ended questions about age, monthly salary, living conditions, monthly rent, etc. were asked. Each study area had approximately 50 respondents who were randomly questioned using the four CBC sets A, B, C, and D. As female workers had limited knowledge about dormitory residences, the author and investigators showed respondents' internal and external pictures of the dormitory to increase their awareness of the appearance of a dormitory from inside and outside. Respondents were asked about their willingness to live in such residences. CBC questionnaire sets were administered to respondents who had the desire to stay in this type of housing.

Those who were eager and had the need to inhabit this housing facility, were briefed about the amenities offered by the dormitory. Thereafter, upon their consideration of renting a bed at the dormitory, they were asked to choose their combination (survey set) of choice. Pictorial options were presented to respondents as a visual representation of the situation, to enable them to choose quickly.

2.5 Conditional Logit Model

A conditional logit model was applied to calculate the part-worth utilities and marginal willingness to pay of each level of all the attributes. Typically, it is assumed that the utility consists of a structural part that can be explained by the estimated model and an error component that cannot be explained. Furthermore, it is typically assumed that the structural part of utility is a linear summation of part-worth (or marginal) utility contributions of the attributes, which can be expressed as follows¹²⁾:

$$U_j = V_j + \varepsilon_j = \beta_0 + \sum_{i=1}^I \beta_i X_{ij} + \varepsilon_j$$

Where,

U_j = overall utility attached to alternative j;

V_j = the structural component of utility; that part of the utility determined by the model;

ε_j = an error component or random part of utility; that part of utility that is not determined by the model;

β_0 = utility constant;

β_i = coefficient to be estimated for attribute i ;

X_{ij} = value of attribute i describing alternative j ;

$\beta_i X_{ij}$ = part-worth (or marginal) utility contribution of attribute i to the overall utility of alternative j .

If it is assumed that ε_j is independently, identically distributed, extreme values and the probability of choosing alternative j (p_j) is expressed as follows¹²⁾:

$$p_j = \frac{e^{V_j}}{\sum_{j' \in S} e^{V_{j'}}}$$

Where S denotes the choice set of j alternatives, and e^{V_j} denotes the exponent of V_j , the structural part of the utility.

Marginal willingness to pay (MWTP) is the amount of money respondents are willing to pay for an upgrade of a product or service in addition to what they are already paying. This means how much extra the female garment workers are willing to pay for a particular feature of a residence by upgrading from a less demandable feature to a high demandable one can be evaluated by calculating MWTP. The word “marginal” refers to the fact that MWTP is always relative to a reference product with various reference features specified and placed in a market with other competitors. Conjoint analysis is considered to be a well-suited method for calculating MWTP. This study estimated MWTP for each feature of housing choice from the respondent’s perspective. Assuming that all attributes except for attribute x_1 are unchanged and utility is assumed to be held constant, then the MWTP, which is the monetary measure for 1 unit change in attribute X_{1j} , is as follows:

$$MWTP_{X_1} = \frac{dp}{dX_1} = -\frac{\beta_1}{\beta_p}$$

A negative value of MWTP means that the variable is preferred by the respondents rather than the reference product ²⁶⁾. Therefore, respondents need to have a reduction in price to be reimbursed for demoting the mediocre variable. To calculate the MWTP, there must be a price attribute in the CBC survey sets. None of the values of the price attribute’s levels should be zero; they should either be all positive or all negative. This research selected all positive values of the price attribute levels.

3. Results and Discussion

3.1 Characteristics of respondents

Socioeconomic characteristics and housing situations were asked in the questionnaire survey. Table 5 describes characteristics of the target respondents who responded to the CBC survey questionnaire sets in four different study areas.

Table 5: Characteristics of respondents

Target (Respondents)	Female garment workers in Gazipur district (Single residence)
Age	18-45 years (Average: 25 years)
Marital Status	Unmarried: 48%, Divorced: 43%, Widow: 9%
Monthly Income	4,000-12,000 BDT (Average: 7,500 BDT)
Distance from workplace	0.5-5 km (Average: 0.5 Km)
Monthly room rent	300-2,500 BDT (Average: 1000 BDT)
Room area covered by one person	1.3-14 m ² (Average: 5.5 sqm)
One room shared with	1-6 Persons (Average: 4 people)
Toilet/bathroom shared with	1-27 Persons (Average: 10 people)
Kitchen shared with	1-15 Persons (Average: 6 people)

As there was a “None” option in every question of each conjoint analysis survey set, the author added a query about its selection. Therefore, if any respondent selected the “None” option in every question, the author asked about the reason behind it. That query was an open-ended question with sample answers for better understanding. This study found 13 persons who had selected “None” for every question. Six persons selected “None” for every question because they did not want to share their room with others. Three persons wanted to have a separate room for Hindus. Others wanted to live with their parents, family, and children.

3.2 Conditional Logistic Regression Analysis

This study performed conditional logistic regression analysis using the software R-3.5.3 with the “survival” package. The findings of the analysis are shown in Table 6. The estimated coefficient shows the consequence of each variable of choosing the house with those characteristics. A positive value of the estimated coefficient specifies an increased probability of choosing, whereas a negative value indicates a decrease in the probability of choosing ²⁶⁾. All variables except price have positive values, which means that those household features influence respondents’ choices of housing. Dormitories where female workers have to share rooms with only four people are preferred over dormitories where they must share a room with ten people. However, price has a negative value. This negative sign means respondents want to spend less on rented houses.

Table 6: Findings from conditional regression analysis (Source: Author)

Name of the variables	Estimated co-efficient	Odds ratio	Z Value	P-value
20 m ² room shared with 4 people	1.621	5.062	4.711	<.001
50 m ² room shared with 10 people	1.415	4.120	7.284	<.001
90 m ² room shared with 20 people	-	1.000	-	-
Shared toilet/bathroom with 4 people	0.044	1.046	0.266	0.790
Shared toilet/bathroom with 6 people	0.177	1.194	1.262	0.207
Shared toilet/bathroom with 8 people	-	1.000	-	-
Gas connection with kitchen facility	0.949	2.583	7.855	<.001
Per meal payment with dining facility	-	1.000	-	-
Price	-0.004	0.996	-10.143	<.001

Further, shared room area, shared toilet/bathroom, gas connection with kitchen facility, and price have a P-value less than 0.05. This means that these variables are statistically significant. However, shared toilet/bathroom-related variables had a P-value of more than 0.05. These variables are identified as statistically insignificant.

The odds ratio for each variable indicates the multiplicative effect of the explanatory variable on the dependent variable ²⁷⁾. Having “Shared toilet/bathroom with 6 people” criteria in the house rather than “Shared toilet/bathroom with 4 people” criteria increases the odds of that house being chosen by 19.4%. Similarly, “Sharing toilet/bathroom with 4 people” has 4.6% increased odds of being chosen. Having the criteria of “20 m² room shared with 4 people” increases the odds of that house being selected five times. Similarly, having a criterion of “50 m² room shared with 10 people” increases the odds of that house being chosen four times. On the other hand, “Gas connection with kitchen facility” has two times increased odds of being preferred. The odds ratio of the variable “Price” is 0.996, meaning that an increase in the price of one unit would cause a 1% reduction in the odds of purchasing. The z-value can be used to measure the distance of the estimated coefficients from the null hypothesis, assuming a normal distribution of the log it ²⁸⁾.

To summarize, the analysis found “Shared room area” as the most important attribute of all. The workers preferred to share their rooms with fewer people. They did not wish to live in a residence with chaos and no privacy. They preferred living in Mess type houses with more privacy, than in the government dormitory by sharing a room with more than 30 people. That is why a 20 m² room shared with four people was considered more preferable by the RMG workers than a 50 m² room shared with 10 people, while having the same area covered by every single person. Not only the size of the room, but privacy is also evaluated with the same value. A garment worker works all day long, and sometimes even overtime. They need peace during the nighttime after passing a long, tiring day in the industry (from interviews with the respondents of the questionnaire survey). “Dining facility” is perceived as the second most important attribute from the regression analysis. Interview surveys revealed that female workers had very low budgets—on an average BDT 130-150—for their daily meals. Therefore, spending more than BDT 150

would be considered a burden for some. As a result, they did not want the “per meal facility” where there would be no option to save money, preferring instead to have a “gas connection with kitchen facility” in their residence, which would enable them to save some money on their daily meal budget. On the other hand, sharing a toilet or bathroom with more than six people felt rather obnoxious for female workers, given that they would have to wait in long queues to avail the facility, hampering their work in the morning. For these workers, as time is money, every second is valuable (from an interview with respondents of the questionnaire survey).

This study also evaluated the marginal willingness to pay for each variable (Table 7) by using the “Krinsky and Robb method,” with 95% confidence level ⁽²²⁾. During calculations, the study considered “Price” as a monetary variable, and “20 m² room shared with 4 people, 50 m² room shared with 10 people, sharing toilet/bathroom with 4 people, sharing toilet/bathroom with 6 people and gas connection with kitchen facility” as the non-monetary variables.

Table 7: Marginal willingness to pay for each variable (Source: Author)

Name of the variables	MWTP (BDT)	2.5% Confidence interval (BDT)	97.5% Confidence interval (BDT)
20 m ² room shared with 4 people	403.08	272.20	512.56
50 m ² room shared with 10 people	351.90	282.53	422.43
Sharing toilet/bathroom with 4 people	11.14	-78.26	85.53
Sharing toilet/bathroom with 6 people	44.12	-25.82	109.09
Gas connection with kitchen facility	235.83	170.42	318.07

Respondents were willing to pay BDT 403 in addition to the price of “50 m² room shared with 10 people,” and were willing to pay BDT 351 in addition to the price of “90 m² room shared with 20 people.” Similarly, if they share toilet/bathroom with four people, they are willing to pay BDT 11 in addition to sharing with six people, and if they share with six people, they are willing to pay BDT 44 more with the addition of eight people. If they have a common kitchen with a gas connection, they are willing to pay BDT 235 more in addition to per meal payment.

To summarize, female workers are willing to pay extra money in return for more privacy, kitchen facilities, and toilets shared with fewer people. Although the wages of these workers are meager, and most of them spend half their salary on home rent, they have particular desires while choosing their residences. Additionally, it was found that respondents wanted to pay more if they had the facility to share rooms with four people and common kitchen facilities, rather than other facilities mentioned as different attribute levels. Therefore, sharing a room with fewer people and a kitchen facility are important factors in the housing choice behaviors of female garment workers in Bangladesh.

Next, the respondents were divided into two groups based on their monthly income: low income (BDT 4,000-7,500) and high income (BDT 7,501-12,000) groups. The conjoint analysis was conducted for each group to understand the difference in their housing preferences by income

group. The results of the analysis are summarized in Table 8. From the analysis, it was found that the odds ratio of the variable “Price” has almost the same value for the low and high income groups. This means that there is little difference in preference to price between the two groups. Nevertheless, it was found that the odds ratio of the variable “Gas connection with kitchen facility” had a larger value (3.193) for the low income group than the high income group (2.105). Kitchen type matters more for low income groups because it affects their living cost. If they can avail gas connections with kitchen facilities rather than per meal payments with dining facilities, they can save money by spending less on their everyday meals.

Table 8: Results of conjoint analysis by different monthly income (Source: Author)

Name of the variables	Respondents with Low income (BDT 4000- BDT 7500) (n=116)				Respondents with High income (BDT 7501- BDT 12000) (n=84)			
	Est. co-efficient	Odds ratio	Z	P	Est. co-efficient	Odds ratio	Z	P
20 m ² room shared with 4 people	1.769	5.863	3.836	0.001	1.572	4.814	2.976	0.003
50 m ² room shared with 10 people	1.429	4.173	5.559	<.001	1.431	4.181	4.786	<.001
90 m ² room shared with 20 people	-	1.000	-	-	-	1.000	-	-
Shared toilet/bathroom with 4 people	0.032	1.032	0.144	0.885	0.075	1.078	0.283	0.777
Shared toilet/bathroom with 6 people	0.158	1.171	0.840	0.401	0.221	1.247	1.018	
Shared toilet/bathroom with 8 people	-	1.000	-	-	-	1.000	-	-
Gas connection with kitchen facility	1.161	3.193	6.971	<.001	0.744	2.105	4.096	0.309
Per meal payment with dining facility	-	1.000	-	-	-	1.000	-	-
Price	-0.004	0.996	-7.759	<.001	-0.004	0.996	-6.862	<.001

4. Conclusion and Recommendations

This study intended to discover which feature discouraged female workers from choosing facilities provided in the government dormitory. An analysis of the results found that housing environments such as the number of people sharing a room, the number of people sharing a toilet/bathroom, and having a common kitchen with gas connection, had a higher impact on housing choices than affordability in the mean price or rent of houses. Further, female workers were willing to pay extra for a specific type of housing environment.

The existing room area space per person in the government dormitory is 3.5-4.6 m², and more than 30 people share one room. The suggestions proposed by this research are that a minimum 5 m² room area space per person should be provided, and no more than four people should share one room, which will increase the total monthly income of the government dormitory. At present, 90 people occupied 836 beds in the dormitory. However, if the dormitory offered more privacy by providing smaller rooms shared by a smaller number of people, the number of boarders will increase, which will in turn increase the dormitory’s total monthly income.

In the present government dormitory, 7-8 people share one toilet or bathroom. However, this study proposes to provide one toilet shared by six persons. Furthermore, the existing dining system of the government dormitory is per meal payment with a dining facility. Under this facility,

the authorities recruited a person to prepare daily meals for the female workers, for which the workers needed to pay a fixed amount (BDT 150 per day). The proposal recommended by this research is to provide a common kitchen with gas connection, so that workers can prepare their own meals, and spend as little on meals as they wish. In this study, monthly rent is less important for respondents than expected, because they can reduce the cost of living in different ways, such as cooking for themselves.

Generally, the wages of female RMG workers are very low. As a result, it is a common misconception that they will always prefer low-cost housing facilities. However, this study found that privacy and common kitchen facilities are considered more important than rent while choosing a house from the perspective of female RMG workers in Bangladesh. Kitchen facilities are particularly important for workers in the low income group compared to other income groups. Housing choice depends on factors such as marital status, household size, income, personal preference, and relative costs of alternative living arrangements ⁽²³⁾. Therefore, it might vary among different people. Pre-investigation of prospective residents is a mandatory prerequisite for the implementation of these types of housing projects. The Bangladesh government is building residential projects for female garment workers to mitigate their suffering related to their housing. However, the projects have not been successful due to a lack of knowledge about female workers' housing preferences. There is a gap between the housing policy of the Bangladesh government towards female garment workers' housing issues, and their housing preferences. The results of this research could fill this gap and contribute to designing housing acceptable to female garment workers, thus eliminating the housing complications they face. Comparative studies should be conducted to determine the housing choices of the target groups of people, in order to build effective and useful housing facilities.

References

- 1) Sikhdar, M. H., Sarkar, S. K., & Sadeka, S. Socio-economic conditions of the female garment workers in the capital city of Bangladesh. *International Journal of Humanities and Social Science*. 2014, Vol. 4, No. 3, p.173-179.
- 2) Bangladesh Garment Manufacturers and Exporters Association (BGMEA), <http://www.bgmea.com.bd/>
- 3) Islam, M. K., & Zahid, D. Socioeconomic deprivation and garment worker movement in Bangladesh: A sociological analysis. *American Journal of Sociological Research*. 2012, Vol.2, No.4, p. 82-89.
- 4) Absar, S. S. Women garment workers in Bangladesh. *Economic and Political Weekly*. 2002, Vol.37, No.29, p.3012-3016.
- 5) Kibria, N. Becoming a garments worker: The mobilization of women into the garments factories of Bangladesh. 1998. UNRISD Occasional Paper (No. 9).
- 6) Bhuiyan, Z. A. Present status of garment workers in Bangladesh: An analysis. *IOSR Journal of Business and Management*. 2012, 3(5), 38-44.
- 7) Rahman, M. H., & Siddiqui, S. A. Female RMG worker: economic contribution in Bangladesh. *International Journal of Scientific and Research Publications*. 2015, Vol.5, No.9, p.1-9.
- 8) UN-Habitat. The Challenge of slums. Earthscan, 2003.
- 9) Rahman, M. M. Problems of the NGOs in housing the urban poor in Bangladesh. *Habitat International*. 2002, Vol.26, No.3, p.433-451.
- 10) Begum, A. Urban housing as an issue of redistribution through planning? The case of Dhaka city. *Social Policy & Administration*. 2007, Vol.41, No.4, p.410-418.
- 11) Shams, S., Mahruf, M., Shohel, C., & Ahsan, A. Housing problems for middle and low income people in Bangladesh: Challenges of Dhaka Megacity. *Environment and Urbanization Asia*. 2014, Vo.5, No.1, p.175-184.
- 12) Ali, R. N., Begum, M. M., Salehim, K. S., & Farid, K. S. Livelihood pattern of rural women garment workers at Dhaka city. *Journal of the Bangladesh Agricultural University*. 2008, Vol.6, p.449-456.
- 13) Akhter, S., Salahuddin, A. F. M., Iqbal, M., Malek, A. B. M. A., & Jahan, N. Health and occupational safety for female workforce of garment industries in Bangladesh. *Journal of Mechanical Engineering*. 2010, Vol.41, No.1, p.65-70.
- 14) Ahmed, S., & Raihan, M. Z. Health status of the female workers in the garment sector of Bangladesh. *J Faculty Econom Administr Sci*. 2014, Vol.4, No.1, p.43-58.
- 15) Jansen, S.J.T., Coolen, H.C.C.H., & Goetgeluk R. W. eds. *The Measurement and Analysis of Housing Preference and Choice*. Springer, 2011.

- 16) Molin, E.J.E. "Conjoint analysis" *The Measurement and Analysis of Housing Preference and Choice*. Jansen, Springer, 2011, p.127-156.
- 17) Kim, H., Yoon, Y., & Mutinda, M. Secure land tenure for urban slum-dwellers: A conjoint experiment in Kenya, Habitat International, 2019, Vol.93.
- 18) Das, S. & Arup, M. & Rajnish, K. Do neighbourhood facilities matter for slum housing? Evidence from Indian slum clusters. *Urban Studies*. 2016, Vol.54. p.1-17.
- 19) Gazipur District – Banglapedia, <http://en.banglapedia.org>
- 20) Agarwal, J., DeSarbo, W. S., Malhotra, N. K., & Rao, V. R. An interdisciplinary review of research in conjoint analysis: Recent developments and directions for future research. *Customer Needs and Solutions*. 2015, Vol.2, No.1, p.19-40.
- 21) Alves, S., Aspinall, P. A., Ward Thompson, C., Sugiyama, T., Brice, R., & Vickers, A. Preferences of older people for environmental attributes of local parks: The use of choice-based conjoint analysis. *Facilities*. 2008, Vol.26 No.11/12, p.433-453.
- 22) Aizaki, H., & Nishimura, K. Design and analysis of choice experiments using R: a brief introduction. *Agricultural Information Research*. 2008, Vol.17, No.2, p.86-94.
- 23) Jansen, S. J., Coolen, H. C., & Goetgeluk, R. W. eds. *The measurement and analysis of housing preference and choice*. Springer Science & Business Media, 2011.
- 24) Sawtooth Software. *The CBC System for Choice-Based Conjoint Analysis*. Sawtooth software TECHNICAL PAPER SERIES, Version 9, 2017.
- 25) Conjoint.ly. Alternatives to conjoint analysis. <https://conjoint.online/guides/alternatives-to-conjoint/>.
- 26) Costa, E., Montemurro, D., & Giuliani, D. Consumers' willingness to pay for green cars: A discrete choice analysis in Italy. *Environment, Development and Sustainability*. 2019, 21, p.2425–2442
- 27) Aizaki, H. Basic functions for supporting an implementation of choice experiments in R. *Journal of statistical software*. 2012, Vol.50, p.1-24.
- 28) Don E. Albrecht, Scott Loveridge, Stephan Goetz and Rachel Welborn. *Rural Housing and Economic Development*. Routledge, 2019.